

WHAT IS CLAIMED IS:

5

1. An internal unit incorporated in a body of a submarine apparatus, the unit comprising:

a plurality of system units placed in a predetermined arrangement, the system units
10 including at least one electronic-circuit printed board having a part to be adjusted; and

coupling bars fixed to coupling-bar fixing surfaces of said system units by screws so as to couple said system units in said predetermined
15 arrangement,

wherein said coupling-bar fixing surfaces are located at positions shifted from said electronic-circuit printed board.

20

2. An internal unit incorporated in a body of a submarine apparatus, the unit comprising:

a plurality of system units placed in a predetermined arrangement, the system units
25 including an optical-fiber containing portion containing an optical fiber, an electric-supply-line containing portion containing an electric-supply
30 line, and at least one electronic-circuit printed board having a part to be adjusted; and

coupling bars fixed to coupling-bar fixing surfaces of said system units by screws so as to couple said system units in said predetermined
35 arrangement,

wherein said coupling-bar fixing surfaces are located at positions shifted from said optical-

fiber containing portion, said electric-supply-line containing portion, and said electronic-circuit printed board.

5

3. The internal unit as claimed in claim 1, wherein each of said system units has inclined surfaces on both sides thereof; and
10 said inclined surfaces form said coupling-bar fixing surfaces.

15

4. The internal unit as claimed in claim 2, wherein each of said system units has inclined surfaces on both sides thereof; and
20 said inclined surfaces form said coupling-bar fixing surfaces.

25

5. The internal unit as claimed in claim 1, further comprising a plurality of covers fixed to said coupling bars by screws so that each of said covers lies across the coupling bars adjacent in a circumferential direction,
30 wherein the covers adjacent in the circumferential direction are placed so as to form a gap therebetween, the gap being located at a position opposing each of said screws fixing said
35 coupling bars.

6. The internal unit as claimed in claim 2, further comprising a plurality of covers fixed to said coupling bars by screws so that each of said covers lies across the coupling bars adjacent in a circumferential direction,

wherein the covers adjacent in the circumferential direction are placed so as to form a gap therebetween, the gap being located at a position opposing each of said screws fixing said coupling bars.

7. The internal unit as claimed in claim 1, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

8. The internal unit as claimed in claim 2, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

5

9. The internal unit as claimed in claim 3, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

15

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

20

10. The internal unit as claimed in claim 4, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

25

30

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

35

11. The internal unit as claimed in claim 5, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

12. The internal unit as claimed in claim 6, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

13. The internal unit as claimed in claim 1, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit

being stacked on each other,

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

5 said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

10

14. The internal unit as claimed in claim
15 2, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-
20 supply circuit unit and the control circuit unit being stacked on each other,

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

25 said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

30

15. The internal unit as claimed in claim
35 3, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit

including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

5 said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

 said control circuit unit has a
10 trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

15

16. The internal unit as claimed in claim 4, wherein each of said system units comprises an optical circuit unit including an optical circuit
20 component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

25 said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

 said control circuit unit has a
30 trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

35

17. The internal unit as claimed in claim

5, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

18. The internal unit as claimed in claim 6, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

5 a plurality of system units placed in a
predetermined arrangement, the system units
including at least one electronic-circuit printed
board having a part to be adjusted; and
coupling bars fixed to coupling-bar fixing
0 surfaces of said system units by screws so as to
couple said system units in said predetermined
arrangement,

20 20. A submarine apparatus comprising:
 a cylindrical airtight body; and
 an internal unit incorporated in said body,
 the internal unit including:

coupling bars fixed to coupling-bar fixing surfaces of said system units by screws so as to couple said system units in said predetermined arrangement,

35 wherein said coupling-bar fixing surfaces
are located at positions shifted from said optical-
fiber containing portion, said electric-supply-line

containing portion, and said electronic-circuit printed board.

5

21. The submarine apparatus as claimed in claim 19, wherein each of said system units has inclined surfaces on both sides thereof; and

10 said inclined surfaces form said coupling-bar fixing surfaces.

15

22. The submarine apparatus as claimed in claim 20, wherein each of said system units has inclined surfaces on both sides thereof; and

20 said inclined surfaces form said coupling-bar fixing surfaces.

25

23. The submarine apparatus as claimed in claim 19, further comprising a plurality of covers fixed to said coupling bars by screws so that each of said covers lies across the coupling bars adjacent in a circumferential direction,

30

 wherein the covers adjacent in the circumferential direction are placed so as to form a gap therebetween, the gap being located at a position opposing each of said screws fixing said coupling bars.

35

24. The submarine apparatus as claimed in claim 20, further comprising a plurality of covers fixed to said coupling bars by screws so that each of said covers lies across the coupling bars
5 adjacent in a circumferential direction,

wherein the covers adjacent in the circumferential direction are placed so as to form a gap therebetween, the gap being located at a position opposing each of said screws fixing said
10 coupling bars.

25. The submarine apparatus as claimed in claim 19, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a
20 control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting
25 mounted on an outer surface thereof.

26. The submarine apparatus as claimed in claim 20, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a
30 control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

5

27. The submarine apparatus as claimed in claim 21, wherein each of said system units
10 comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit
15 unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

20

28. The submarine apparatus as claimed in claim 22, wherein each of said system units
25 comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit
30 unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

35

29. The submarine apparatus as claimed in claim 23, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

30. The submarine apparatus as claimed in claim 24, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other, and

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

31. The submarine apparatus as claimed in claim 19, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit

unit being stacked on each other,

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

5 said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

10

32. The submarine apparatus as claimed in
15 claim 20, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the
20 power-supply circuit unit and the control circuit unit being stacked on each other,

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

25 said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

30

33. The submarine apparatus as claimed in
35 claim 21, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply

circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

5 said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

 said control circuit unit has a
10 trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

15

34. The submarine apparatus as claimed in claim 22, wherein each of said system units comprises an optical circuit unit including an
20 optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

25 said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

 said control circuit unit has a
30 trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

35

35. The submarine apparatus as claimed in

claim 23, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

36. The submarine apparatus as claimed in claim 24, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.